

One plastic bag: Interdisciplinary eco-pedagogies for a broad and balanced education

Global Studies of Childhood

2026, Vol. 16(2) 150–167

© The Author(s) 2025



Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/20436106251355343

journals.sagepub.com/home/gsc**Edina Kulenovic** 

Primary Education, Middlesex University, UK

Clare Harding 

Primary Education, Middlesex University, UK

Michaela Griffiths 

Primary Education, Middlesex University, UK

Shukri Mohammed 

Primary Education, Middlesex University, UK

Anne Mulligan 

Primary Education, Middlesex University, UK

Philip Jefferies 

Primary Education, Middlesex University, UK

Abstract

Matter matters. For Donna Haraway, in *Staying with the Trouble* (2016), “it matters which stories tell stories, which concepts think concepts. Mathematically, narratively and visually, it matters which figures figure figures, which systems systematise systems.”¹ Yet the existing UK education statutory system or curriculum, both for Primary schools and those training to be teachers of Primary pupils, has woefully little reference to environmental and ecological concerns, let alone guidance on how to address its burning realities for those who will suffer its consequences most acutely. On ecofeminist principles, Gaard (2009) and others have pointed out the need to acknowledge non-white ecocritical scholars, eco-activists, environmental writers and artists, including those producing works of children’s literature. This article examines one such work

Corresponding author:

Edina Kulenovic, School of Health and Education, Primary Education, Middlesex University, The Burroughs, London, NW4 4BT, UK.

Email: E.Kulenovic@mdx.ac.uk

of children's literature: *One Plastic Bag: Isatou Ceesay and the Recycling Women of Gambia* (2015), authored by Miranda Paul and illustrated by Elizabeth Zunon, as a teacher-education model of ecofeminist literature to explore a range of interdisciplinary Primary (aged four-to-ten-years) ecopedagogies.

Keywords

ecopedagogy, climate emergency, sustainability, planetarianism, eco-actant

'As we negotiate the troubled times ahead, wisdom and humility will be at a premium. It is both salutary and inspiring to think that the leaders of tomorrow are in schools and universities today where they will be developing the ideas and abilities which will permeate their own lives and those of people around them' (Scoffham and Rawlinson, 2022: 48).

Eco-literacy matters

As Bateson (1987: 60) pointed out in *Steps to an Ecology of Mind*, "We are really systems through which matter is continuously passing". Systems and matter really matter. For Donna Haraway, in *Staying with the Trouble* (2016), 'it matters which stories tell stories, which concepts think concepts. Mathematically, narratively and visually, it matters which figures figure figures, which systems systematise systems' (Haraway, 2016: 12) Yet the existing UK education statutory system or curriculum, both for Primary schools and those training to be teachers of Primary pupils, has woefully little reference to environmental and ecological concerns, let alone guidance on how to address its burning realities for those who will suffer its consequences most acutely.

Addressing environmental problems and systems of educational and social justice is also a concern for ecofeminism as a perspective that sees these issues as interconnected. Ecofeminists make connections across sexism, speciesism and the oppression of land and nature as well as critiquing other oppressions such as racism and colonialism, "as part of western culture's assault on nature" (Gaard, 2009: 12). On this principle, Gaard pointed out the need to acknowledge non-white eco-critical scholars, eco-activists environmental writers and artists, including those producing works of children's literature. Often described as environmental works of 'eco-literacy' in the field of 'climate literacy' (Oziewicz, 2021), such literature aims to develop readers' understandings of the ways in which local, national and global ecologies interact and react to climate change challenges "for better and for worse" (Gaard, 2009: 15), such as sustainable and unsustainable practices, how environmental degradation affects land, life and community, and how non-patriarchal, decolonised forms of eco-action can promote environmental well-being and social justice.

This article examines one such work of children's literature: *One Plastic Bag: Isatou Ceesay and the Recycling Women of Gambia* (2015), authored by Miranda Paul and illustrated by Elizabeth Zunon, as a teacher-education model of ecofeminist literature to explore a range of interdisciplinary Primary (aged four-to-ten-years) ecopedagogies. Suggesting the Global North can learn lessons from "developing countries"- a decolonising approach that signals the importance of hyperlocal approaches- the book's story is situated in an eco-activist project led by women in Njau, Gambia, "disrupting dominant narratives that define Black relations with the environment mostly through loss and absence" (Nxumalo, 2018) and challenging patriarchal, colonial histories and geographies of the Global South, offering a positive, community-led model of change in the face of negative human impact by repurposing plastic litter using design innovation.

Planetary interdisciplinarity

We argue that projects like *One Plastic Bag* represent an epistemological orientation proposed by Marek Oziewicz (via the Centre for Climate Literacy²) as ‘planetarianism’: “an alternative to the dominant neoliberal discourse that renders Earth as expendable and unsavable.” As he describes it, “a two-level phenomenon, planetarianism refers to a *biocentric commitment to stand up for the planet and our common biospheric legacy* in everything we do: how we work, eat, travel, and live. . . planetarianism operates as *applied hope articulated through stories*—a form of hope-as-resistance and a conceptual tool for ushering in the future we want (instead of the future we fear)” (Oziewicz, 2021). To question what environmental knowledge is, how it is created and where it comes from, we argue that planetarianism must necessarily be interdisciplinary. Acknowledging the complexity of environmental education and its interacting, interdependent elements, the interdisciplinary approach goes beyond fixed and single subject disciplinary limits by considering plural perspectives via multiple ecopedagogic approaches.

The UK curriculum programmes of study for Geography and History generically recommend that pupils question, compare, group and record changes, patterns, relationships and findings from their environment and its history. By Year Four (aged 8), the Primary National Curriculum (Science) (Department for Education [DfE], 2014: 158) advises: ‘pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation’. The Design and Technology curriculum (DfE, 2014: 1) wants pupils to ‘learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world’, and the Citizenship curriculum suggests pupils learn that ‘resources can be allocated in different ways and that these economic choices affect individuals, communities and the sustainability of the environment’ (DfE, 2014: 4). These few statements are currently the only direct opportunity for teachers to consider ecopedagogy as their approach.

Kidron and Kali (2015) argue that interdisciplinarity is a learning process that integrates insights and perspectives, and advances pupils’ understanding through various subjects. Learning takes place when different subjects are interrelated and pupils develop their knowledge, skills and understanding through a learning experience via a theme, topic or problem. For Barnes (2011), interdisciplinarity promotes creative thinking, encourages imaginative approaches to teaching and allows pupils to make connections between subjects and concepts. However, Rowley and Cooper (2009) argue that interdisciplinarity can support pupils to make links between subjects but inhibit opportunities to learn deeply. Similarly, Young and Muller (2010) state that integrating subjects can weaken the boundaries between subjects, school knowledge and everyday knowledge resulting in generic curriculum content.

Yet teaching climate change in arts and humanities courses can be done holistically, by drawing on an integrative discourse. An integrative discourse sees climate change as interconnected with multiple processes of environmental, economic, political, and cultural change and closely linked to individual and shared norms, beliefs, values, and worldviews, and questioning accepted norms and unsustainable practices. Leichenko and O’Brien (2020) argue that, as ecopedagogic courses and programmes are developed, “providing integrative, ‘Anthropocene’-ready learning tools and conceptual frameworks will be critical for our students’.

Consequently, in response to the ‘What is the Triple Planetary Crisis’ (climate change, pollution and biodiversity loss, as defined by the United Nations, 2022), the team working on Primary teacher education at Middlesex University have devised an interdisciplinary curriculum model

working across topic themes. Over many years a Planetarian curriculum has developed for teacher education that values interdisciplinarity and the arts, approached in non-linear, thematic ways, taking the model from Primary schools' topic work projects, where all tutors are expected to work both within and outside their subject specialisms. Both BA and PGCE students are allocated a themed week (such as *No Planet B*, for example) during which they work collaboratively in groups to develop presentations which explore how to enhance children's learning through creative cross-curricular planning and taking learning beyond the classroom.

The *One Plastic Bag* session is taught as part of Middlesex University's teacher education *No Planet B* week. Students use the picturebook *One Plastic Bag* (Paul, 2015) as a catalyst to explore imaginative ways of using recycled materials and reducing plastic pollution when on placement and in post as Primary teachers (Fig. 1). It is an uplifting true story of Isatou Ceesay, a young Gambian woman, who cleans up her local community when discarded plastic bags became a large environmental and health problem in the village. She turns plastic bags into plastic purses that she sells on, reducing plastic waste at the same time. With the help of others, Isatou transforms her community and shows that even one person can make a difference. It is a topical and inspiring story that student teachers and children enthusiastically engage with. Barnes (2011) observes that it is not difficult to fire children's interest in the environment, as they experience signs of environmental ill-health all around them, and plastic litter is a common concern for schools and local environments.

Picturebooks' role in eco-pedagogy and challenging normative assumptions

The picturebook is a special form of literature that plays a key role in the introduction of (sometimes contentious) topics to young readers. Leung and Adam-Whittaker (2022) describe how

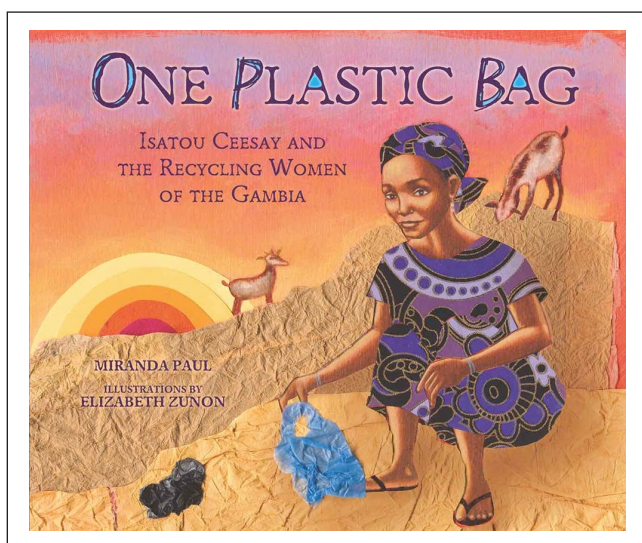


Figure 1. Cover of Miranda Paul's *One Plastic Bag* picturebook, showing the protagonist Isatou Ceesay in traditional West African dress, the Gambia landscape collaged in paper, and the plastic bag of the title, reproduced with permission.

stories from picturebooks can be used as an educational tool to provide a window into the wider outside world. This ability to introduce topics to young readers is central to recognising the potential for picturebooks to be eco-pedagogic and so challenge normative assumptions.

Eco-pedagogies provide opportunities for children's literature to illuminate current environmental issues, the roots of these issues, and strategies that could be used in response. Gaard (2009) highlights the importance of recognising the complex interconnections within eco-pedagogies methods, for example the capacities to address social injustices, environmental health, and colonial histories, and how it is possible to introduce these issues to small children. In this sense, the use of eco-pedagogies offer an opportunity to bring several issues together in one multi-dimensional picturebook. Möller (2020) suggests that 'complex conversations about social justice-both current and historical-can be navigated with elementary-aged children', but it is also important to recognise that Primary teachers may be reluctant to tackle topics considered sensitive. Normative assumptions which involve stereotypical representations of people, families, places and events, (where a dominant group is presented as 'normal') can obscure the depiction of other groups and opinions. This can present inherent challenges for teachers who might feel reluctant to tackle potentially sensitive topics. We align with Wiltse and Boyko (2015) who argue that such reluctance can be overcome by building a tolerance for discomfort.

Vasquez et al. (2019) discuss the opportunity for picturebook responses to spark action beyond the classroom by supporting or empowering the participants. The story of the lone Gambian woman, Isatou Ceesay in *One Plastic Bag*, is an example of this mode of ecopedagogy as it opens up the topics of climate change, collective feminist approaches and environmental activism, whilst also suggesting the imperative to decolonise literature and the curriculum. As a West African artist from the Ivory Coast, Zunon illustrates books reflecting global diversity, with warm oil painted skin tones, cut-out layers of yellows, oranges and reds for African landscapes and traditionally patterned fabrics for clothing. *One Plastic Bag* features collages made using traditional wax and hand-dyed Gambian fabric, crumpled paper and actual plastic, which work together allow for creative 'possibility thinking' (Craft, 2015) and complex conversations in the face of a combination of issues to be seen, explored and challenged. Zunon's attention to the *matter* of thrown away plastic (whether floating, crumpled, cut up, piled, dirty or stinking) is a key signifier throughout the book.

Plastic bags: The environmental facts

'Plastic bags pollute the air through their life cycle, from raw material extraction and manufacturing process to disposal' (Bowen et al., 2022). Plastic bags are formed of fossil fuel (mostly crude oil and natural gas) and one single-use plastic bag is equivalent to 1.58 kg CO₂e, or 8 km of driving. Plastic bags are difficult and costly to recycle and most are ultimately burnt, releasing toxic fumes or buried in landfill sites where they take around 300 years to photodegrade. As discarded litter, plastic bags have been found to capture water, providing breeding grounds for mosquitoes and waterborne diseases, as well as becoming stormwater rain blockages, affecting habitats and tangled up in water-based life. Plastic breaks down over time into tiny toxic particles that contaminate the soil and waterways and enter the food chain as microplastics where many different species including humans ingest them. To mitigate the problem of plastic bag pollution, research into developing new degradable bag technologies and safely reusing bags is in progress, though the problem of plastic remains hugely complex (Osgood, 2019).

In the session where trainee-teachers are first introduced to the picturebook *One Plastic Bag*, students are read the story and explore Elizabeth Zunon's illustrations (cleverly collaged out of folded traditional West African fabrics, plastic and paper bags). They are then shown some horrifying facts about the scale of plastic bag pollution worldwide. Asked which of these facts shocked

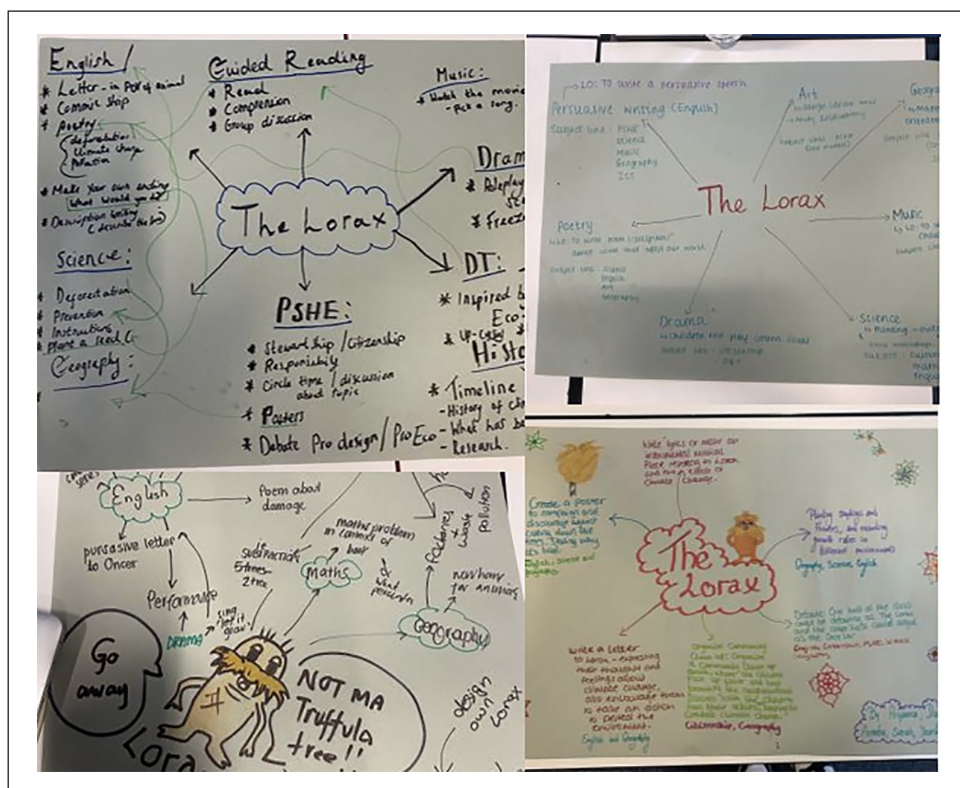


Figure 2. Interdisciplinary planning for Primary teaching by small groups of students, based on *The Lorax*, reproduced with permission.

them or which facts they were unaware of, elicited different responses. The idea of finding 5.9 kilos of plastic inside a dead whale, contemplating how unfathomably enormous the plastic island is, or how little plastic is actually recycled, set off powerfully affective forces within the classroom. Students contributed to the discussion by offering personal experiences of recycling or waste practices at the university and local environment in which they live. Examining initiatives around the world, such as tourist boats that net rubbish in the canals of Amsterdam, gathering plastic waste that then gets recycled into more boats, plastic recycled into bricks for school buildings and a research project from Sheffield University repurposing foam mattresses for plant growing in Zaatari refugee camp in Jordan – the world's largest camp for people displaced by the Syrian Civil War – student teachers noted it was only once an indigenous farmer took up the mattress system of growing that caused other local growers to follow suit and make important contextual adaptations. These are important moments of meta-teaching, where the tutor reminds the teacher education students to tease out the nuances of collaborative - rather than colonial - models from western powers to that of the Global South, when they in turn are teaching this to children. Applying every learning experience at university as directly and practically as possible to Primary student teacher placements in schools is a priority, and further sessions later in the week involve understanding how to plan. The students use a second picture book, *The Lorax* by Dr Seuss (1971), to plan an interdisciplinary suite of activities with an environmental theme (Fig. 2).

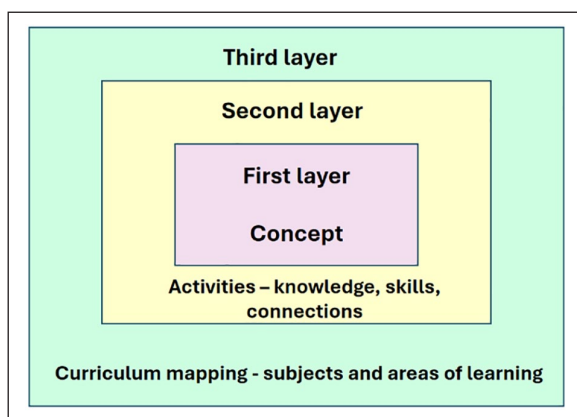


Figure 3. Three-layered map for interdisciplinary planning and teaching in Primary schools, devised at Middlesex University by Linda Whitworth.

Subsequently, students return to *One Plastic Bag* and co-write a two-week planning grid for Primary English, following the National Curriculum English teaching and learning objectives and a tutor model. The tutor is then able to tease out what elements of the sessions already develop knowledge and skills in English: making links between texts (picture books and film clips), asking questions to improve understanding, making inferences and predictions, as well as noting and developing initial ideas and presenting these orally. Students are encouraged to explore how a 90-minute session on campus can expand into at least 2 weeks of reading, writing, speaking and listening with Primary pupils – all with an ecopedagogical purpose. Students leave the session with an increased understanding of how teachers must take every opportunity to incorporate issues relating to climate change, sustainability, and biodiversity into their planning across the curriculum, wherever and whenever possible.

Whilst critics (e.g. Young and Muller, 2010) of interdisciplinary teaching and learning argue that blurring traditional subject boundaries may lead to erosion of clear differences between academic and everyday knowledge, for the team at Middlesex the key lies in addressing conceptual knowledge and experience first (at the core), then planning and teaching activities that allow for connections to be made across subjects, and only, finally consider curriculum mapping, or how the teaching and learning ‘maps’ to the existing curriculum. Student teachers are given this three-layered map to dismantle the commonly held misconception that environmental education amounts to ‘doing’ Geography, or Science (Fig. 3).

First layer

Frodeman (2010), cited in Kidron and Kali (2015) observes that a critical skill of the 21st century is to think and integrate knowledge across disciplines and to understand relations between fields of knowledge. In line with the interdisciplinary approach, the *One Plastic Bag* session starts holistically with the concept of plastic pollution and its impact, rather than individual subjects. Learners evaluate the scale of the issue; statistics and videos are shared and discussed with them.

Second layer

The second layer identifies the skills, activities, connections, learning and planning opportunities which will engage and educate Primary children about this topic. When used effectively, planning

for interdisciplinary learning can allow teachers to be more creative (as evidenced in Education Scotland, 2021). Blue sky thinking is promoted during the activity; student teachers are asked to work in small groups and design their own product, made from recycled plastic, modelled as they would then teach it in the classroom. The product should be unique and have a positive impact on communities and the wider world; and it should function in real life scenarios. Learners are thus encouraged to use their creative, problem-solving and marketing skills when creating the product, and to be open to all creative ideas, whilst maintaining a degree of realism. Then must then pitch their product to a group of 'investors', i.e. their peers and tutors. Pedagogic examples might be working in groups for 20 minutes to imagine their own initiatives for repurposing waste products, then sharing ideas to the class in 2 minutes pitches: car tyre flip-flops; water bottles transformed into transparent exam pen pots; make-up packaging turned into pen casings (imaginatively named 'RePENt'); or eco-friendly smart phones made of bamboo, cork and recycled plastic. As the tutor remarked, 'if phone design companies aren't already doing this, they absolutely should be'.

Elevator pitches are enjoyed by student teachers and children alike. Budding entrepreneurs use their critical thinking skills to discuss, argue and persuade an audience to invest. They must consider who the product is aimed at (who will benefit the most), its saleability, how much it costs to make and how much profit the investors (tutors and peers) are expected to make! They are then 'grilled' by their peers and teachers who will decide whether to invest their cash and by how much. This activity is supported by the fact that "interdisciplinary learning provides a stimulating and self-motivating context for learning and is both enjoyable and relevant" (Education Scotland, 2012: 1). In terms of critical eco-literacy, however, learners also need to be encouraged to question solutions that directly stem from or feed into western scientific models of conquering, fixing, or overcoming, building their awareness of 'granular stories' and the non-innocence of what appear to be 'natural' solutions (see Osgood and Odegard, 2022, on the non-innocence of cork, for example).

Third layer

The third layer reveals the subjects that were evident in this project, such as STEM subjects, geography, English, PSHE, art, DT and Citizenship. They make cross-curricular links between these subjects and look for different ways of creating new learning opportunities for children and how they can use these new skills.

With schools prioritising attainment and progress in core subjects, concerns remain that the curriculum is biased in favour of core subjects (Eaude and Catling, 2019) and that teaching time is narrowly focused on English and mathematics at the expense of the procedural knowledge and skills learned through foundation subjects (Boys and Spink, 2008; Eaude et al. 2017). This has been compounded by the Covid-19 pandemic, resulting in Year Six pupils having less experience in the foundation subjects (generally not taught during partial school closures due to pressures of statutory testing and challenges of teaching remotely, Ofsted, 2022). Worryingly, when inspecting Key Stage One, it is only deemed necessary to focus on literacy and numeracy skills (Eaude and Catling, 2019) 'so that they (pupils) are able to access a broad and balanced curriculum at Key Stage 2' (Ofsted, 2019: 228) rather than recognising the potential of the foundation subjects, particularly humanities and arts subjects as 'the most powerful, most meaningful and most relevant areas of learning' (Boys and Spink, 2008: xii).

The importance of humanities in the primary curriculum provides a sharp focus for BA primary education students in their first trimester at university. They learn how humanities subjects, (i.e. History, Geography and Citizenship) enable children to discover their identity, develop transferable skills, and 'make sense of a complex world' (Grigg and Hughes, 2013: 6–7). Through humanities children consider the choices people make about their lives within the confines of different

eras, social constructs and places providing a firm foundation through which human values can be explored (Rowley and Cooper, 2009). Students discover that through the teaching and learning of humanities subjects, children develop interpersonal knowledge – knowing about oneself and knowing how to interact with others (Eaude et al., 2017: 347).

Through the ‘Discovering the Humanities’ module, students explore benefits of enquiry-led learning and how this develops children’s questioning, thinking, reasoning and interpretative skills (Cooper, 2017; Pickford, 2013). Children ask and begin to answer their own questions, thereby igniting natural curiosity, which has proved important to human evolution (Grigg and Hughes, 2013: 72). While on school experience week, trainees observe and reflect on teaching humanities subjects as a means to enable children to learn and practise lifelong transferable skills (Pickford, 2013).

Through educational visits galleries and museums across London, outdoor learning activities and a collaborative local area study, trainees enjoyed and reflected upon experiences of learning beyond the classroom. In an assignment concerning the importance of humanities in the curriculum, trainees demonstrated their understanding of the uniqueness of humanities in providing exciting opportunities for children to value the local environment and how this develops a sense of identity, pupil motivation and environmental awareness (Scoffham, 2017). Students articulated how learning outdoors affords a sense of freedom, activating creativity and imagination, allowing children to make autonomous choices and become resourceful. With twenty-first century children living more sedentary lives, exacerbated further in a post-pandemic world (Pickering, 2017), humanities provide rich, varied and meaningful learning experiences beyond the school gates.

As Bachelors of Arts (BA) students reflect on the potential impact of their study on future practice, it is encouraging that many recognised how the humanities provide young learners with an enriched, engaging and inclusive curriculum, with opportunities to develop their identity, explore diverse societies, and become empathetic towards others (Eaude and Catling, 2019). Humanities subjects encourage learners to critically reflect on the challenges in their own lives as well as those faced by more generally (Grigg and Hughes 2013: 20). Diverse cohorts of trainee teachers on the BA course reflected on their own early education and the extent to which humanities contributed towards their sense of identity, self-worth, values and beliefs, enabling them to be ‘active, inclusive and thoughtful citizens’ (Whitworth, 2023). Many trainees define effective humanities education as that which embraces diversity and takes care to include all children through culturally responsive school-level curriculum design (Nakkeeran, 2022). The key benefits of an effective humanities education were opportunities to explore identity, social, cultural and ethical issues, resulting in positive, long-term effects as learners and citizens in an increasingly fragile world (Eaude and Catling, 2019; Oxfam, 2006).

Climate change and its impact is mentioned in the Science curriculum for older learners (from KS3) but could feature throughout the Geography primary curriculum (DfE, 2014). ‘Teaching should equip pupils with knowledge about diverse places, people, resources and natural and human environments, together with a deep understanding of the Earth’s key physical and human processes.’ (DfE, 2014 Geography p.1) The geography elements in the *One Plastic Bag* session scaffolds students’ understanding of plastic pollution as a significant environmental issue, and where plastic pollution is most visible, such as in developing Asian and African countries. In addition, students learn and reflect on how plastics move around the world, how they harm wildlife, how microplastics break down and what might be done to slow down the tide. ‘Plastic trash has become so ubiquitous it has prompted efforts to write a global treaty negotiated by the United Nations.’ (National Geographic, 2019). Making links with real life issues through Geography is meaningful and relevant which leads to better student engagement and ultimately, better in-depth understanding. As Environmental, youth Activist, Greta Thunberg stresses ‘we can no longer pick and choose our actions - we need to do everything we can’ (Thunberg, 2022: 327).

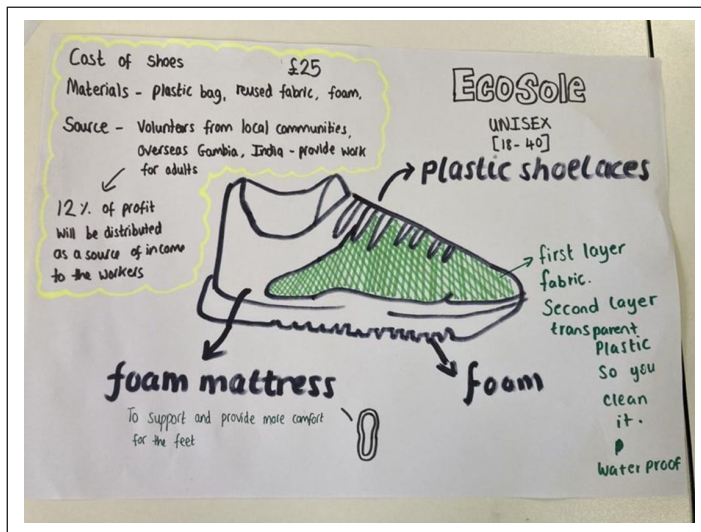


Figure 4. Student design for EcoSole; eco-friendly trainers made from plastic, recycled foam mattresses and fabric, reproduced with permission.

Design and Technology (D&T) elements are crucial to this project, as students were required to creatively use recycled materials to design and build a product. Key skills in the D&T curriculum put into practice included: understanding the properties of the recycled materials; generating ideas; developing those ideas into a product; and finally evaluating the product. In relation to technology, students utilised various materials to research, communicate, and present their product. Students also explored how technological advancements could potentially help in recycling and reducing plastic pollution. In addition to the core Design and Technology skills, students honed their project management capabilities. This involved learning to effectively plan, manage time, and efficiently utilise available resources. They also gained valuable problem-solving experience as they navigated challenges to emerge during the product design process. For example, determining the most effective use of the recycled materials at their disposal was a critical consideration, as was ensuring that the final product was environmentally and user-friendly (and aesthetically pleasing). The project facilitated the development of teamwork and communication skills; working collaboratively on product development, they learnt to share ideas, provide and accept feedback and reach consensus on critical design decisions. Presentations provided an opportunity to refine public speaking and develop persuasion skills to judges (thereby raising awareness of the range of skills developed in pupils doing similar activities; see Figs 4 and 5).

Student feedback reflected a growing awareness of interdisciplinary eco-skills, such as role play, creative dialogue, pictorial modelling, effective questioning, and collaborative, student-led thinking and decision-making. They commented: ‘We enjoyed the idea of pitching a product. We had to think on our feet when the ‘investors’ asked challenging questions with regards to environmentally-friendly materials or budgeting. . . it made learning more interactive and fun. . . Through this activity, children will learn the skills of empathy, collaboration, teamwork, problem-solving, critical thinking and negotiation, which everyone will need in environmental crises’. Students noted the value of ‘sensory, collaborative, active, questioning, explorative and investigative’ pedagogies, including ‘creative ways of establishing patterns between different subjects’, where ‘revisiting a concept or skill from different perspectives is more meaningful’.



Figure 5. Student design for eco-friendly hostel and school; a refugee community re-using plastic and other waste materials, reproduced with permission.

Knit One, Purl One

The D&T session led effectively into the next unit: **Pattern**. One of the follow-up sessions, called **Knit One, Purl One (Pattern with a Purpose)**, was created in direct relation to working with the picturebook *One Plastic Bag*. In the unit students learn about the history, purpose and benefits of knitting; they create a knitting or crocheting pattern and make a knitted or crocheted piece using ‘plarn’ (plastic yarn made from strips of plastic bags), as in the book. Knitting as a feminist practice (e.g. Kelly 2014) shifts a craft often assumed hyper-feminine and highly domesticated to that of activist empowerment, especially when context-specific. As students manipulate the yarn and needles, they struggle with and refine their hand-eye coordination and dexterity, presenting an interesting challenge to the developmental assumption that adults’ fine motor skills necessarily outstrip those of children. Many students found learning to knit for the first time challenging and one was overheard to remark, ‘This is the most frustrating, yet oddly satisfying session I have experienced’. Students also explored the possibility of knitting with objects other than standard needles, such as pencils or chop sticks, encouraging more creative thought about everyday objects and their uses and attunement to the scarcity of global resources (See Figs 6 and 7).

The benefits of creative activities such as knitting and crochet on mental health and well-being are well-documented (Burns and Van Der Meer, 2020; McCleod et al., 2022; Sjöberg and Porko-Hudd, 2019). Considered relaxing and therapeutic activities which enable participants to engage in social interaction while creating something worthwhile and purposeful. McCleod et al. (2022) take the idea of crafting a step further, seeing it as a scaffold with which students can deepen their,

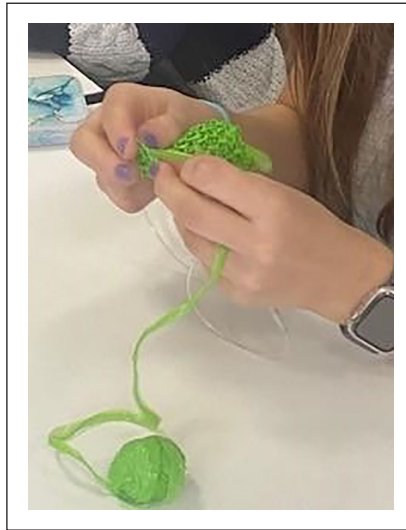


Figure 6. Student knitting with plarn, reproduced with permission.

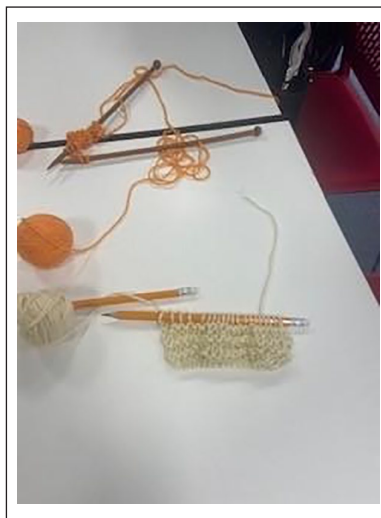


Figure 7. Knitting with pencils, reproduced with permission.

understanding of mathematics concepts. They use it as part of a university course with positive results in terms of both mathematical understanding and the crafts produced. The Knit One, Purl One activity with our students also scaffolds understandings of mathematics when mathematical patterns provide the basis for the knitted or crocheted pieces created.

References are made to the picturebook throughout. Examples of student teacher ideas for activities which weave across Mathematics, English, D&T, Geography, History and Citizenship were: to create a Gambia fact file, research the recurring image of a crocodile (on the one-dalasi coin, Gambian bank-notes, textiles, jewellery, and in Gambian folk tales), communicate and exchange with a Gambian

- Tasked with creating a product using recycled materials.
- Inspired by Isatou Ceesay's initiative, we've crafted a solution to address disposable coffee cup waste: Disposable Compostable Coffee Cups.
- 2.5 billion coffee cups disposed annually in the UK alone, with a meager 0.25% recycling rate.
- Coupled with the staggering accumulation of coffee ground waste: 250,000 tonnes in the UK and 54 million tonnes in the US.
- Our solution: a compostable disposable coffee cup made from recycled coffee grounds, paper, and beeswax.
- Aim: to drastically reduce coffee cup and coffee ground waste while promoting environmental sustainability, taking inspiration from Isatou Ceesay by using what we have and wasting to turn into items we can utilise.

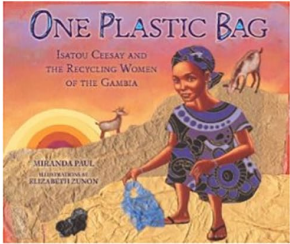



Figure 8. Slide from student group presentation detailing compostable coffee cup idea, inspired by the story *One Plastic Bag*, reproduced with permission.

school, organise a school plastics challenge, a litter pick, enter the Earth Day competition, invite Isatou for an interview, run a school assembly on plastic pollution, use strips of discarded plastic bags and knit or weave their own products. Students reflect on the interdisciplinary teaching and learning opportunities, including links across subjects. In addition, they analyse the pedagogies employed in the session (guided, sensory, experiential, creative) and implications for classroom practice.

These might include researching and questioning both local and global plastic use and abuse, developing new skills by making and selling recycled products at school fairs, raising awareness of plastic pollution, becoming a plastic-free school, or using resources responsibly. ‘The responsibility for action and wise decision-making rests with us all. It is incumbent on us to behave responsibly in our private life and not to squander Earth’s precious resources’ (Scoffham and Rawlinson, 2022: 33). In some cases, students’ reflections and contributions to presentations were deeply personal, such as the student whose work as a barista, making 500 coffees per shift, inspired her to design a compostable rather than simply recyclable coffee cup (Fig. 8).

The benefits of collaboration, planning, creating activist material in response to the climate crisis ran through the presentations and artwork produced for assessment.

These sentiments are reflected in the banners produced by students (Fig. 9) and the questions and statements with which they open and close their presentations:

- Can we save planet Earth?
- Why don’t people do more about climate change?
- Is it our last chance to change?
- It’s never too early for children to learn about the environment and what we can do.

An important element of the group presentations was feedback given by other students. As one student commented: “*You were really passionate in your presentation, and that’s exactly what teachers need to be.*”



Figure 9. Student banners designed to raise awareness of climate emergency, reproduced with permission.

Inconclusions: the lively matter of litter as eco-actant

Picturebooks like *One Plastic Bag* reveal both literature and litter as Bennet's (2010) 'vibrant matter,' Barad's (2015) dynamic, or 'lively matter,' or as Latour's 'actants'. Latour's (1999) use of the term is that an actant is "a source of action that can be either human or non-human; it is that which has efficacy, can *do* things, [. . .] make a difference, produce effects, alter the course of events" (in Bennett, 2010: viii). Plastic encountered as litter works as an actant to begin a conversation on plastic pollution, exposing the entangled, relational nature of everyday material life. The ecopedagogies described throughout this article are relatable and directly transferable to classroom practice, as one student commented '*In my teaching, I'm going to adopt interdisciplinary approaches and use the theme of plastic pollution to teach children about the real-life environmental issues*'.

Repeated littering in *One Plastic Bag* is an actant for Isatou Ceesay, and beyond her story, an actant for better understanding eco-initiatives in the Global South, which "comes to matter as a globally-mobile actant in the planetary emergency" (Taylor et al., 2022: 218). This is important in that the Global South is disproportionately affected by plastic pollution. As Cooper (2024) points out, the world's plastic must come from somewhere, yet the shopping habits of people in less developed countries do not align with the amount of waste that amasses there. The exportation of plastic waste from developed countries in the Global North for recycling in other countries is common practice. Both teachers and children may not know that what they put in their own recycling bins could wend its way to Isatou's Ghanaian village; a form of colonial violence enacted on countries of the Global South. Part of what Nxumalo and Rubin call 'critical discard studies' is the deliberate foregrounding of such connections between hidden factors such as neoliberal waste governance involving "technocratic out of sight/out of mind waste management approaches", "waste's entanglement with proliferative consumption and environmental injustices in waste disposal" (2019: 270)."

If, as research suggests, interdisciplinary pedagogies help learners to integrate school, lesson and life with one another (Deneme and Ada, 2012), it can empower student teachers to plan on the basis that pupils need to make links with real life issues, such as the dangers of plastic pollution and what can be done to reduce it, at both individual and Global scales. Kvale cited in Thunberg (2022: 87), reflects on the future of plastic recycling, where ‘Worldwide, our waste management systems remain both leaky and incapable of recycling many of the products on the market’. As Cooper (2024) points out, there is a western cynicism to this, as “for developed countries, sending their plastic waste elsewhere is ideal: it’s cheap, helps meet recycling targets, and reduces the need for domestic landfill. However, for developing countries it’s far from ideal’. She argues that ‘the refusal by developing countries to deal with the waste of the world could create a very different future. One where developed countries can’t just put their ‘recycled’ plastic waste out of sight; out of mind. We may see the creation of new, more sustainable recycling infrastructure closer to home. The future may shift the burden of plastic pollution from developing countries to our doorstep. Will we be willing to clean up the mess?’ (Cooper, 2024).

Planetarian teaching suggests some optimism for future learners; not least via the ecopedagogic and mobilising use of Planetarianist literature for children. As Oziewicz (2021) defines it, “Planetarianist fiction envision the planet as a living entity, imagines a non-ecocidal socio-economic system, depicts disanthropocentrized relations among humanity and other life forms, and gestures at a biocentric multispecies future that is worth living for. . . It mobilizes hope for the planet by engaging anticipatory imagination as a tool for disrupting ecocide, creating space for healing, and enabling meaningful change.” At Middlesex University, the shared hope-as-resistance is that the next generation of teachers as actants carry the knowledge that all matter matters in their work; not least from the story of one plastic bag.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Edina Kulenovic  <https://orcid.org/0009-0003-7531-9964>

Clare Harding  <https://orcid.org/0009-0008-3909-5242>

Michaela Griffiths  <https://orcid.org/0009-0007-7451-7503>

Shukri Mohammed  <https://orcid.org/0009-0008-8155-7711>

Anne Mulligan  <https://orcid.org/0009-0000-5793-0776>

Philip Jefferies  <https://orcid.org/0009-0008-4571-8661>

Notes

1. From Donna Haraway’s “It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what worlds make worlds, what worlds make stories” (*Staying with the Trouble* 2016: 12).
2. The Centre for Climate Literacy at <https://www.climatelit.org> is an open access, searchable online compendium of resources for teaching climate literacy using books, films, games, apps and more. open-access, searchable, online compendium of resources for teaching climate literacy in every classroom using books, films, games, apps, and more. an open-access, searchable, online compendium of resources for teaching climate literacy in every classroom using books, films, games, apps, and more.

References

- Barnes J (2011) *Cross-Curricular Learning 3-14* (2nd ed). London: Sage.
- Bateson G (1987) *Steps to an Ecology of Mind*. Chicago: The University of Chicago Press.
- Bennett J (2010) *Vibrant Matter: A Political Ecology of Things*. Durham and London: Duke University Press.
- Bowen L, Jinxi L, Boxin Y, et al. (2022) The environmental impact of plastic grocery bags and their alternatives. *IOP Conf. Ser.: Earth Environ. Sci.* 1011.
- Boys R and Spink E (Eds) (2008) *Teaching the Foundation Subjects*. London: Continuum.
- Burns P and Van Der Meer R A (2020). Happy Hookers: Findings from an international study exploring the effects of crochet on wellbeing. *Faculty of Science, Medicine and Health - Papers: Part B*. Available at: <https://ro.uow.edu.au/smhpapers1/1621>
- Cooper H (2024) How the global South is disproportionately affected. *by plastic pollution*. Available at: <https://finalstrawfoundation.org/2023/06/02/how-the-global-south-is-disproportionately-affected-by-plastic-pollution/>
- Cooper H (2017) *Teaching History Creatively*. London: Routledge.
- Craft A (2015) Possibility thinking: From what is to what might be. *The Routledge Handbook of Research on Teaching Thinking*.
- Department for Education (2014) National Curriculum in England; Programmes of study. Available at: [Programme_of_Study_KS1_and_2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/299943/Programme_of_Study_KS1_and_2.pdf) (publishing.service.gov.uk).
- Deneme S and Ada S (2012) *On applying the Interdisciplinary Approach in Primary Schools*, Available at: (PDF) On Applying the Interdisciplinary Approach in Primary Schools (researchgate.net).
- Eaude T and Catling S (2019) *The Role of the Humanities* Chartered College of Teaching. Available at: <https://impact.chartered.college/article/the-role-of-the-humanities-balanced-primary-curriculum/>
- Eaude T, Butt G, Calling S, et al. (2017) The future of the humanities in primary schools - reflections in troubled times. *Education 3-13* 45(3): 386–395.
- Education Scotland (2012) CFE Briefing Interdisciplinary Learning. Available at: https://dera.ioe.ac.uk/id/eprint/17803/7/IDLBriefing_tcm4-732285_redacted.pdf
- Education Scotland (2021) *Interdisciplinary learning: ambitious learning for an increasingly complex world*, Available at: [Interdisciplinary Learning: ambitious learning for an increasingly complex world](https://www.education.gov.scot/media/100241/interdisciplinary-learning-ambitious-learning-for-an-increasingly-complex-world.pdf) (education.gov.scot).
- Frodeman R (2010) 'Introduction'. In: Frodeman R, Thompson-Klein J and Mitcham C (eds) *The Oxford Handbook of Interdisciplinarity*. Oxford: Oxford University Press, pp. 29–39.
- Gaard G (2009) Children's environmental literature: from ecocriticism to ecopedagogy. *Neohelicon* 36: 321–334. <https://doi.org/10.1007/s11059-009-0003-7>
- Grigg R and Hughes S (2013) *Teaching Primary Humanities*. London: Pearson.
- Haraway D (2016) *Staying with the Trouble: Making Kin in the Chthulucene*. Duke University Press.
- Kelly M (2014) Knitting as a feminist project? *Women's Studies International Forum* 44:133–144.
- Kidron A and Kali Y (2015) Boundary breaking for interdisciplinary learning. *Res Learn Technol* 23: 42.
- Latour B (1999) *Pandora's Hope*. Cambridge, Massachusetts: Harvard University Press.
- Leichenko R and O'Brien K (2020) Teaching climate change in the Anthropocene: an integrative approach. *Anthropocene* 30:100241. DOI: 10.1016/j.ancene.2020.100241.
- McCleod J, Wilson P, Pomeroy D and Alderton J (2022) Crafting connections in post-COVID classrooms: learning university mathematics through craft. *International Journal of Mathematical Education in Science and Technology* 53(3):728–737.
- Möller, K. J. (2020). Reading and responding to LGBTQ-inclusive children's literature in school settings: Considering the state of research on inclusion. *Language Arts* 97(4): 235–251. <https://www.jstor.org/stable/26908385>
- Nakkeeran M (2022) Will a new history curriculum support schools to be more inclusive? *The Royal Society of Arts*. Available at: <https://www.thersa.org/blog/2022/05/will-a-new-history-curriculum-support-schools-to-be-more-inclusive>
- National Geographic (2019) Plastic pollution facts and information. Available at: [nationalgeographic.com](https://www.nationalgeographic.com/environment/land-use/plastic-pollution-facts/)

- Nxumalo F (2018) Situating Indigenous and Black Childhoods in the Anthropocene. In: Cutter-Mackenzie A, Malone K and Barratt Hacking E (eds) *Research Handbook on Childhoodnature*. Springer International Handbooks of Education. Cham: Springer. https://doi.org/10.1007/978-3-319-51949-4_37-1
- Ofsted (2019) Inspecting the Curriculum. Available at: https://assets.publishing.service.gov.uk/media/5d1dfeba40f0b609dde41855/Inspecting_the_curriculum.pdf
- Ofsted (2022) Education Recovery in Schools. Available at: <https://www.gov.uk/government/publications/education-recovery-in-schools-summer-2022/education-recovery-in-schools-summer-2022#:~:text=In%20some%20schools%2C%20we%20saw,described%20in%20our%20previous%20briefings>.
- Osgood J and Odegard N (2022) Crafting granular stories with child-like embodied, affective and sensory encounters that attune to the world's differential becoming. *Australian Journal of Environmental Education* 2022: 1–15.
- Osgood J (2019) 'You Can't Separate It from Anything': Glitter's Doings as Materialized Figurations of Childhood (and) Art. In: Sakr M and Osgood J (eds) *Postdevelopmental Approaches to Childhood Art*. London: Bloomsbury Academic, pp. 111–136. Available at: <http://dx.doi.org/10.5040/9781350042575.ch-007> (accessed 18 July 2025).
- Oxfam (2006) Education for Global Citizenship: a guide for schools. Oxford: Oxfam. http://www.oxfam.org.uk/~media/Files/Education/Global%20Citizenship/education_for_global_citizenship_a_guide_for_schools.ashx
- Oziewicz M (2021) *Planetaryism* Available at: <https://www.climatelit.org/glossary/>
- Paul M (2015) *One Plastic Bag*. Minneapolis: Millbrook Press.
- Pickford T, Garner W and Jackson E (2013) *Primary Humanities: Learning through Inquiry*. London: Sage.
- Pickering S (ed) (2017) *Teaching Outdoors Creatively*, London: Routledge.
- Rowley C and Cooper H (eds) (2009) *Cross-curricular Approaches to Teaching and Learning*. London: Sage.
- Scoffham S (2017) *Teaching Geography Creatively*. London: Routledge.
- Scoffham S and Rawlinson S (2022) *Sustainability Education - A Classroom Guide*. London: Bloomsbury Academic.
- Sjöberg B and Porko-Hudd M (2019). A life tangled in yarns—Leisure knitting for well-being. *Techne serien-Forskning i slöjdpedagogik och slöjdvetskap* 26(2): 49–66.
- Taylor C, Hogarth H, Barrett Hacking, et al. (2022) Posthuman object pedagogies: Thinking with things to think with theory for innovative educational research. *Cultural and Pedagogical Inquiry, Summer* 14(1): 206–221. University of Alberta. Available at: <http://ejournals.library.ualberta.ca/index.php/cpi/index>
- Thunberg G (2022) *The Climate Book*. London: Random House.
- United Nations Climate Change (2022) *What is the Triple Planetary Crisis?* Available at: What is the Triple Planetary Crisis? | UNFCCC.
- Vasquez VM, Janks H and Comber B (2019) Critical literacy as a way of being and doing. *Language Arts* 96(5): 300–311.
- Young M and Muller J (2010) Three Educational Scenarios for the future: Lessons from the sociology of knowledge. *European Journal of Education* 45(1): 11–27.
- Whitworth L (2023) *Humanities 2020..* Available at: <https://shows.acast.com/humanities-2020-podcast/episodes/humanities-2020-linda-whitworth>
- Wiltse L and Boyko T (2015) “‘Cause It Has to Happen”: Exploring Teachers' Resistance to LGBT Literature and Issues in a Teacher Inquiry Group. *LEARNING Landscapes* 9(1): 285–302. <https://doi.org/10.36510/learnland.v9i1.758>

Author biographies

Edina Kulenovic A Senior Lecturer in Primary Education at Middlesex University in London, UK, Edina teaches science and geography to the Primary Initial Teacher Training programmes. She has over 10 years of experience teaching in primary and secondary schools. Her research interests include integrating environmental and sustainability themes into the primary curriculum and promoting experiential learning. Her other research area includes the importance of multilingualism in the primary classroom. Edina is a Fellow of the Higher Education Academy.

Clare Harding A Senior Lecturer in Primary Education at Middlesex University, Clare specialises in English and Special Educational Needs, teaching across Primary Initial Teacher Training programmes and leading on Primary teaching apprenticeships. As a class teacher for 25 years before moving into Higher Education, she worked in varied settings, including outer London primary and junior schools and an international independent school. Her research interests are varied, and include reading for pleasure and sustainability education.

Michaela Griffiths A Senior Lecturer in Primary Education at Middlesex University, Michaela has 23 years' experience teaching and leading in Primary schools in central England. Following six years as a headteacher, she transferred to Higher Education leading Initial Teacher Education professional practice, mentor training and Primary history. Invested in the transformative power of education, taking children beyond the classroom and widening opportunities central approaches that she advocates.

Shukri Mohammed A Lecturer in Primary Education at Middlesex University, Shukri teaches Computing, Science and foundation subjects across BA and PGCE programmes. She has over ten years of teaching experience in inner London schools, including leadership and curriculum development roles. Her research interests include Computing in Primary Education, trainee teachers' understanding of science concepts, and the application of educational neuroscience to classroom practice.

Dr Anne Mulligan Anne is a Senior Lecturer in Primary Education at Middlesex University in London where she teaches primary mathematics on the Initial Teacher Education programmes. She has over 20 years of experience teaching in the primary classroom, specialising in KS1, and spent four years as a Deputy Head Teacher before moving to Teacher Education. Anne is Programme Leader for the PGCE Primary (QTS) programme and is a Fellow of the Higher Education Academy. Her areas of interest include problem-solving and anxiety in mathematics, as well as the role of mathematics for sustainable development.

Philip Jefferies A Senior Lecturer in Primary Education at Middlesex University, Philip specialises in English, Religious Education and Special Educational Needs, teaching across Primary Initial Teacher Training programmes and is currently the programme leader for the undergraduate route into teaching. Philip was a primary aged class teacher for 10 years before moving into Higher Education in 2011. He worked in varied settings, including outer London primary and junior schools as well as some time in New Zealand. His research interests include promotion of equality and diversity in education.